



012679-105.ST25

SEQUENCE LISTING

<110> Lee, Jong Seob
Kim, Yun Hee
Choi, Eun kyung
Yoo, So Yeon
Ahn, Ji Hoon
Choi, Yang Do

<120> Gene Controlling Flowering Time of Plants and Method for
Manipulating Flowering Time of Plant Using the Same

<130> 012679-105

<140> US 10/780,703

<141> 2004-02-19

<150> KR 10-2003-10772

<151> 2003-02-20

<160> 9

<170> FastSEQ for Windows Version 4.0

<210> 1

<211> 1140

<212> DNA

<213> Arabidopsis thaliana

<220>

<221> CDS

<222> (1)...(1137)

<223> cDNA of LOV1 gene

<400> 1

atg gca att gta tcc tcc aca aca agc atc att ccc atg agt aac caa	48
Met Ala Ile Val Ser Ser Thr Thr Ser Ile Ile Pro Met Ser Asn Gln	
1 5 10 15	

gtc aac aat aac gaa aaa ggt ata gaa gac aat gat cat aga ggc ggc	96
Val Asn Asn Asn Glu Lys Gly Ile Glu Asp Asn Asp His Arg Gly Gly	
20 25 30	

caa gag agt cat gtc caa aat gaa gat gaa gct gat gat cat gat cat	144
Gln Glu Ser His Val Gln Asn Glu Asp Glu Ala Asp Asp His Asp His	
35 40 45	

gac atg gtc atg ccc gga ttt aga ttc cat cct acc gaa gaa gaa ctc	192
Asp Met Val Met Pro Gly Phe Arg Phe His Pro Thr Glu Glu Glu Leu	
50 55 60	

ata gag ttt tac ctt cgc cga aaa gtt gaa ggc aaa cgc ttt aat gta	240
Ile Glu Phe Tyr Leu Arg Arg Lys Val Glu Gly Lys Arg Phe Asn Val	
65 70 75 80	

gaa ctc atc act ttc ctc gat ctt tat cgc tat gat cct tgg gaa ctt	288
Glu Leu Ile Thr Phe Leu Asp Leu Tyr Arg Tyr Asp Pro Trp Glu Leu	
85 90 95	

cct gct atg gcg gcg ata gga gag aaa gag tgg tac ttc tat gtg cca 336
 Pro Ala Met Ala Ala Ile Gly Glu Lys Glu Trp Tyr Phe Tyr Val Pro
 100 105 110

aga gat cgg aaa tat aga aat gga gat aga ccg aac cga gta acg act 384
 Arg Asp Arg Lys Tyr Arg Asn Gly Asp Arg Pro Asn Arg Val Thr Thr
 115 120 125

tca gga tat tgg aaa gcc acc gga gct gat agg atg atc aga tcg gag 432
 Ser Gly Tyr Trp Lys Ala Thr Gly Ala Asp Arg Met Ile Arg Ser Glu
 130 135 140

act tct cgg cct atc gga tta aag aaa acc cta gtt ttc tac tct ggt 480
 Thr Ser Arg Pro Ile Gly Leu Lys Lys Thr Leu Val Phe Tyr Ser Gly
 145 150 155 160

aaa gcc cct aaa ggc act cgt act agt tgg atc atg aac gag tat cgt 528
 Lys Ala Pro Lys Gly Thr Arg Thr Ser Trp Ile Met Asn Glu Tyr Arg
 165 170 175

ctt ccg cac cat gaa acc gag aag tac caa aag gct gaa ata tca ttg 576
 Leu Pro His His Glu Thr Glu Lys Tyr Gln Lys Ala Glu Ile Ser Leu
 180 185 190

tgc cga gtg tac aaa agg cca gga gta gaa gat cat cca tcg gta cca 624
 Cys Arg Val Tyr Lys Arg Pro Gly Val Glu Asp His Pro Ser Val Pro
 195 200 205

cgt tct ctc tcc aca aga cat cat aac cat aac tca tcg aca tca tcc 672
 Arg Ser Leu Ser Thr Arg His His Asn His Asn Ser Ser Thr Ser Ser
 210 215 220

cgt tta gcc tta aga caa caa caa cac cat tca tcc tcc tct aat cat 720
 Arg Leu Ala Leu Arg Gln Gln Gln His His Ser Ser Ser Ser Asn His
 225 230 235 240

tcc gac aac aac ctt aac aac aac aac aac atc aac aat ctc gag aag 768
 Ser Asp Asn Asn Leu Asn Asn Asn Asn Asn Ile Asn Asn Leu Glu Lys
 245 250 255

ctc tcc acc gaa tat tcc ggc gac ggc agc aca aca aca acg acc aca 816
 Leu Ser Thr Glu Tyr Ser Gly Asp Gly Ser Thr Thr Thr Thr Thr Thr
 260 265 270

aac agt aac tct gac gtt acc att gct cta gcc aat caa aac ata tat 864
 Asn Ser Asn Ser Asp Val Thr Ile Ala Leu Ala Asn Gln Asn Ile Tyr
 275 280 285

cgt cca atg cct tac gac aca agc aac aac aca ttg ata gtc tct acg 912
 Arg Pro Met Pro Tyr Asp Thr Ser Asn Asn Thr Leu Ile Val Ser Thr
 290 295 300

aga aat cat caa gac gat gat gaa act gcc att gtt gac gat ctt caa 960
 Arg Asn His Gln Asp Asp Asp Glu Thr Ala Ile Val Asp Asp Leu Gln
 305 310 315 320

aga cta gtt aac tac caa ata tca gat gga gcg aca acg cta atg cct 1008
 Arg Leu Val Asn Tyr Gln Ile Ser Asp Gly Ala Thr Thr Leu Met Pro

325	330	335	
caa act caa gcg gcg tta gct atg aac atg att cct gca gga acg att			1056
Gln Thr Gln Ala Ala Leu Ala Met Asn Met Ile Pro Ala Gly Thr Ile			
340	345	350	
cca aac aat gct ttg tgg gat atg tgg aat cca ata gta cca gat gga			1104
Pro Asn Asn Ala Leu Trp Asp Met Trp Asn Pro Ile Val Pro Asp Gly			
355	360	365	
aac aga gat cac tat act aat att cct ttt aag taa			1140
Asn Arg Asp His Tyr Thr Asn Ile Pro Phe Lys			
370	375		

<210> 2

<211> 379

<212> PRT

<213> Arabidopsis thaliana

<400> 2

Met Ala Ile Val Ser Ser Thr Thr Ser Ile Ile Pro Met Ser Asn Gln			
1	5	10	15
Val Asn Asn Asn Glu Lys Gly Ile Glu Asp Asn Asp His Arg Gly Gly			
20	25	30	
Gln Glu Ser His Val Gln Asn Glu Asp Glu Ala Asp Asp His Asp His			
35	40	45	
Asp Met Val Met Pro Gly Phe Arg Phe His Pro Thr Glu Glu Glu Leu			
50	55	60	
Ile Glu Phe Tyr Leu Arg Arg Lys Val Glu Gly Lys Arg Phe Asn Val			
65	70	75	80
Glu Leu Ile Thr Phe Leu Asp Leu Tyr Arg Tyr Asp Pro Trp Glu Leu			
85	90	95	
Pro Ala Met Ala Ala Ile Gly Glu Lys Glu Trp Tyr Phe Tyr Val Pro			
100	105	110	
Arg Asp Arg Lys Tyr Arg Asn Gly Asp Arg Pro Asn Arg Val Thr Thr			
115	120	125	
Ser Gly Tyr Trp Lys Ala Thr Gly Ala Asp Arg Met Ile Arg Ser Glu			
130	135	140	
Thr Ser Arg Pro Ile Gly Leu Lys Lys Thr Leu Val Phe Tyr Ser Gly			
145	150	155	160
Lys Ala Pro Lys Gly Thr Arg Thr Ser Trp Ile Met Asn Glu Tyr Arg			
165	170	175	
Leu Pro His His Glu Thr Glu Lys Tyr Gln Lys Ala Glu Ile Ser Leu			
180	185	190	
Cys Arg Val Tyr Lys Arg Pro Gly Val Glu Asp His Pro Ser Val Pro			
195	200	205	
Arg Ser Leu Ser Thr Arg His His Asn His Asn Ser Ser Thr Ser Ser			
210	215	220	
Arg Leu Ala Leu Arg Gln Gln His His Ser Ser Ser Ser Asn His			
225	230	235	240
Ser Asp Asn Asn Leu Asn Asn Asn Asn Ile Asn Asn Leu Glu Lys			
245	250	255	
Leu Ser Thr Glu Tyr Ser Gly Asp Gly Ser Thr Thr Thr Thr Thr			
260	265	270	
Asn Ser Asn Ser Asp Val Thr Ile Ala Leu Ala Asn Gln Asn Ile Tyr			
275	280	285	
Arg Pro Met Pro Tyr Asp Thr Ser Asn Asn Thr Leu Ile Val Ser Thr			
290	295	300	

Arg Asn His Gln Asp Asp Asp Glu Thr Ala Ile Val Asp Asp Leu Gln
 305 310 315 320
 Arg Leu Val Asn Tyr Gln Ile Ser Asp Gly Ala Thr Thr Leu Met Pro
 325 330 335
 Gln Thr Gln Ala Ala Leu Ala Met Asn Met Ile Pro Ala Gly Thr Ile
 340 345 350
 Pro Asn Asn Ala Leu Trp Asp Met Trp Asn Pro Ile Val Pro Asp Gly
 355 360 365
 Asn Arg Asp His Tyr Thr Asn Ile Pro Phe Lys
 370 375

<210> 3

<211> 2606

<212> DNA

<213> Arabidopsis thaliana

<220>

<221> gene

<222> (1)...(2606)

<223> genomic DNA of LOV1 gene

<400> 3

```

atggcaattg tatcctccac aacaagcatc attcccatga gtaaccaagt caacaataac 60
gaaaaaggta tagaagacaa tgatcataga ggcggccaaag agagtcattg ccaaaatgaa 120
gatgaagctg atgatcatga tcatgacatg gtcattgccg gatttagatt ccattcctacc 180
gaagaagaac tcatagagtt ttaccttcgc cgaaaagttg aaggcaaacg ctttaattgta 240
gaactcatca ctttcctcga tctttatcgc tatgatcctt gggaacttcc tggtaaataat 300
acattcacat aaacacacat aaatcatctc aaactatttg gaaatcttaa tttctattca 360
tatgttaaga tctttcttct ctcttatcac tttctctctc tatttctttt tttttaacct 420
atatatgtac ctacctcctt atgaagtatt actatgtcga tcgttaacaa ttctcaatat 480
ctttaaacgc ttctccctct ttagtttctt tcttaatta acctaatata acaacctaca 540
tatatatcat aagatatata aatatgtgta tgttttcata attagcttat gtatgtttaa 600
tcatagatat atgtatatgc agctatggcg gcgataggag agaaagagtg gtacttctat 660
gtgccaaagag atcggaaata tagaaatgga gatagaccga accgagtaac gacttcagga 720
tattggaaag ccaccggagc tgataggatg atcagatcgg agacttctcg gcctatcgga 780
ttaaagaaaa ccctagtgtt ctactctggt aaagccccta aaggcactcg tactagtgtg 840
atcatgaacg agtatcgtct tccgcacat gaaaccgaga agtaccaaaa ggtataaatt 900
ctactataac tctatatata tcttattcat acatacatag atataaccct agctagggtg 960
tgaggccttt aaaattgaaa ttaatcccta gacagtttga attttttctt ttttgactag 1020
ttttatttat ttattttgga attgattcga taagatcaaa aatacttgtg aatggactaa 1080
atgtcaggcg gcgtttgcgc ttaaattccag aaaaatgttc atgtcatatg cgtgaactct 1140
ttaaattgct agacatggcc catatgttat agtgaatac attaatagat agatgcatac 1200
acatatatat aaacacacaa gtatcacact cgacattcat atacctaat tctgcagaga 1260
catagttagt ttttcttaca atttatgaca tgaatgttcc tgctcttctt cacattaatt 1320
catgtcttct atttaagtta cccaacattt tttgaaataa tttggcatat atgaattata 1380
ccaacatatt tatatgcgaa cattttaaatt ctatacgaat gataacggtt tatggagtag 1440
accgaaaaaa tattatgtat acggaaaatg acaatggata gataaataca ttttttgggc 1500
tctttcgact tatatgtcgt caccatttga aaccataaat ttataaaatt ttctatgtat 1560
atatatgata ttatgatgta tgcataagac agctaaaaca acagggttga cataattatc 1620
tatgtgtatg tattgcacat tcaattgtac taataaaaact aaaattacgc aattaaatat 1680
ataaaaaata ataaatataa tcatcttaat tatatttgca ttgttacgtc atatgatagt 1740
actctaaatt tcttctaaac gtgctatctt tttttgctaa tgctaacttt acatagtttg 1800
tgaatcttct ttcaaaacca tatcttcgat aaatgatatt tttcatagat attgttagtc 1860
tatatttgat aatttgatat atgtatcaag tctctaatac atgtgctcat gtataattat 1920
aggctgaaat atcattgtgc cgagtgtaca aaaggccagg agtagaagat catccatcgg 1980
taccacgttc tctctccaca agacatcata accataactc atcgacatca tcccgtttag 2040
ccttaagaca acaacaacac cattcatcct cctctaatac ttccgacaac aaccttaaca 2100
acaacaacaa catcaacaat ctcgagaagc tctccaccga atattccggc gacggcagca 2160

```

```

caacaacaac gaccacaaac agtaactctg acgttaccat tgctctagcc aatcaaaaaca 2220
tatatcgtcc aatgccttac gacacaagca acaacacatt gatagtctct acgagaaatc 2280
atcaagacga tgatgaaact gccattgttg acgatcttca aagactagtt aactaccaaa 2340
tatcagatgg aggtaacatc aatcaccaat actttcaa at tgctcaacag tttcatcata 2400
ctcaacaaca aaatgctaac gcaaacgcat tacaattggg ggctgcggcg actacagcga 2460
caacgcta at gcctcaaact caagcggcgt tagctatgaa catgattcct gcaggaacga 2520
ttccaaacaa tgctttgtgg gatatgtgga atccaatagt accagatgga aacagagatc 2580
actatactaa tattcctttt aagtaa 2606

```

<210> 4

<211> 32

<212> DNA

<213> Artificial Sequence

<220>

<223> Sense primer of LOV1

<400> 4

aatagatctg gtacgcgaca tccatattga aa

32

<210> 5

<211> 31

<212> DNA

<213> Artificial Sequence

<220>

<223> Antisense primer of LOV1

<400> 5

aatagatctc atgggaatga tgcttgttgt g

31

<210> 6

<211> 27

<212> DNA

<213> Artificial Sequence

<220>

<223> Sense primer of FLC

<400> 6

cccgttaact gaacccaaac ctgagga

27

<210> 7

<211> 24

<212> DNA

<213> Artificial Sequence

<220>

<223> Antisense primer of FLC

<400> 7

ccactagtcg cccttatcag cgga

24

<210> 8

<211> 27

<212> DNA

<213> Artificial Sequence

<220>

<223> Sense primer of AGL20

<400> 8
cccgtaaca tggtagggg caaaact

27

<210> 9

<211> 30

<212> DNA

<213> Artificial Sequence

<220>

<223> Antisense primer of AGL20

<400> 9
cccgtaact cactttcttg aagaacaagg

30